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M. FROIDEVAUX'S PARIS LETTER.

PARIS, March 17, 1903.

The *Service des Côtes de France* is charged with the survey and the mapping of the coasts of continental France, as well as those of the other French coasts bathed by the Mediterranean (Corsica, Algeria, and Tunisia). It performs, for this portion of the Atlantic and Mediterranean seaboard, exactly the same duties which fall to the General Hydrographic Service for the other coasts of the globe; it traces, that is to say, the plan of the surveys to be made on our European or North African shores, it publishes the new maps resulting from these surveys, and it corrects and completes the maps already in existence by the latest information received.

The most important of these surveying expeditions within the last twenty years are: The complete survey of the Corsican coasts in 1884–1891; the hydrographical revision of the southern coast of France in 1895–1898; and the survey on a large scale, in 1896, of the lower course of streams on the northern coast of Brittany, the Arguenon, the Trieux, the Tréguier, and the Guer. Other operations during the same period were the reconnaissance of the Gironde between Blaye and the sea, that of the Loire before Paimbœuf and the Bay of Bourgneuf, that of the approaches to Brest and to Dunkerque between Nieuport and Gravelines; and in 1895 the survey of the entrance and the Lake of Bizerta, first undertaken in 1883.

It has been impracticable to organize more than a single yearly expedition for the work on the French coast; a regrettable condition, which, it may be hoped, will undergo a change for the better.

In 1900 the maps published by the *Service des Côtes* numbered 312, of which the most recent were those of the Tunisian coast, the shores of Corsica, the entrances of the Gironde, the Loire, and the Seine, the approaches of Brest, and the Lake of Bizerta. There have since appeared new charts of the southern coast of France and of Brest, while provisional charts, executed by the autophotographic process, supplied navigators at once with the most interesting results obtained by the hydrographic engineers.

Together with the new maps produced, the *Service* publishes its corrections, amounting to more than two hundred in each year, of the charts already in circulation, and besides these the volume of the *Recherches Hydrographiques sur le Régime des Côtes*, in which are inserted the reports of hydrographic reconnaissances, and of nautical commissions, and whatever has for its object the improvement of the ports of France.

Another important section is that of the *Cartes et Archives*, which, with the *Service des Marées*, constitutes the third section of the Hydrographic Service. To this section belong the supervision of the publication and correction of charts, the furnishing of maps and nautical documents to the ports and naval stations, the purchase of foreign maps and charts, and the care and classification of the archives. It is this section, also, which brings out every two years the catalogue of French Hydrography.

The rich archives of the Hydrographic Service are subdivided into technical or *Lesser Archives* and general or scientific, denominated *Greater Archives.* The former supply the data for the construction of charts, while the Greater Archives contain memoirs and reports, manuscript and printed charts and plans, maps of the world—such as the famous Canerio of 1502—general and special maps, log-books of celebrated voyages, manuscripts of the astronomer de l'Isle, of Buache, etc. It is among these collections that M. Henry Harrisse has worked to good result.

In the *Service des Marées*, founded under the Monarchy of July and reorganized in 1886, are performed the calculations required for the *Annuaire des Marées des Côtes de France*, a publication which dates from 1839, and is still calculated in its essential parts according to the methods which Chazallon adopted from the *Mécanique Céleste* of Laplace, although there is a growing tendency to substitute for these the harmonic analysis of the tide due to Lord Kelvin, introduced into the *Service des Marées* since 1893. The *Annuaire des Marées* has published for some years a number of tables, obtained in part by means of the data of the harmonic analysis, in part (for the ports in the colonies) by means of the abridged method of Prof. Darwin;* and for some years past it is in the *Service des Marées* that the elements of the prediction of the tides have been calculated for the ephemerides of the Bureau des Longitudes, in which they have figured since the end of the XVIIIth century.

Of lesser geographical incidents since the date of my last letter may be mentioned the series of lectures organized by M.

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* It is to be noted that the *Service Hydrographique* has possessed since 1901 a Tide Predicter, identical with that of the London India Office, and made by Lord Kelvin's constructor.

Edmond Perrier at the Museum of Natural History, on the productions of our colonies, their geology, and their flora and fauna. A systematic, scientific collection of photographs illustrating the variations of glaciers, the phenomena of denudation and of erosion and the like, would have an especial value for students.

A first step in this direction has been made by the French Alpine Club in an exhibition of unpublished photographs of mountains. By the side of M. Vittorio Sella's views of the Himalayas, taken at a distance of 80 miles, were an excellent panorama of the Wildstrubel and some good views of Mont Blanc, the Alps of Savoy and of Dauphiny; very few, however, in other parts of the Alps, and few of the Pyrenees. Of the central *massif* of France there were two or three views, but not one of the Jura or of the Vosges; so that, as an exhibition of scenery in high mountain regions, the collection was very incomplete, while some of the photographs, to which premiums were awarded, were undeniably falsified. This is the more to be regretted that the idea of the Alpine Club was excellent and much of the work admirable. Future exhibitions will win the approbation of geographers, if the jury does not exclude the views of the lower mountain ranges, and if it insists, first of all, upon the scientific interest and value of the photographs.

The recent meetings of the Société de Géographie have been less attractive, from a scientific point of view, than some of those of last year; though exception must be made in favour of Dr. Sven Hedin's story of his last journey in Central Asia and M. E.-A. Martel's résumé of his subterranean explorations in 1899–1902, in France, in Spain, in Switzerland, and Belgium, etc. M. Martel established beyond question, by examples taken on the spot, the reality of the law of capture and absorption of water-courses by fissured terrains. Action must be taken at once against these captures, and among the most effective measures is reforesting. Returning to these ideas in the number of *La Géographie* for March, M. Martel does not hesitate to affirm, in a notice of the springs which are disappearing in the Department of Aisne, that

> the struggle for the means of quenching thirst, already so sharp from the sanitary and microbian point of view, will become sharper, even as regards quantity alone, in a relatively near future. . . . . It may be predicted that our planet will be parched before the sun is extinguished ; and we must seek for the means of retarding this fatal process of evolution.

In an impressive address before the Alpine Club, Dr. Jacot-Guillarmod described the attempt made by himself, with three

Englishmen and two Austrians, to ascend the Himalayan peak K^2, or Godwin-Austen (28,281 feet high), in Kashmir. Starting at the end of March, 1902, the party reached the Baltoro glacier (56 miles long), and, beginning the ascent at a point 12,000 feet high, attained the elevation of 23,000 feet—a little more than that reached by Sir Martin Conway and his companions in 1892, after seven weeks passed above the level of 18,000 feet. We must wait for the publication of their report before pronouncing upon the scientific value of the feat accomplished by Dr. Jacot-Guillarmod and his friends.

Of explorations in progress there would be little to note except the return of Dr. Cureau and M. Bonnassiès from the frontier of the Kamerun and French Congo, that of M. Duchesne-Fournet from Ethiopia, and the departure of M. Giraud for Martinique and Guadeloupe, if the Société de Géographie had not received sad news concerning M. du Bourg de Bozas. After having reached Lake Rudolf by way of the valley of the Omo, not without fierce fights with the savage Gallas of that region, M. du Bourg de Bozas undertook to continue his journey towards the west in a diagonal direction across the continent and to descend the Welle and the Ubangi to the Congo at Brazzaville. A report written on the Nile appeared in *La Géographie* for February under the title, *From Addis Abbaba to the Nile by Lake Rudolf*, and was hardly printed when the author's death was announced. He expired at Amadis, in the Congo Free State. His companions are on their way to the West African coast with collections and materials for a publication worthy of the young explorer, who, from the very beginning, had done honour to French enterprise.

An expedition of a different kind is projected by Dr. Charcot. He plans a voyage to the Arctic, to the exploration of which France has remained almost entirely strange, according to the following scheme: To start from Tromsö and the Loffoden Islands, to land in Spitsbergen and make collections of fossils for the Museum; then to visit Novaya Zemlya and explore it up the west coast and down the east coast, and to return by the Sea of Kara. M. de Gerlache, the commander of the *Belgica*, and several savants will accompany Dr. Charcot, and the expedition is to be made under the auspices of the Academy of Sciences and the Société de Géographie.*

Some very valuable observations have been made by M. Paul

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* It is reported that the Charcot expedition will be sent, not to the Arctic, but to the Antarctic.—ED. BULLETIN.

Girardin on the variations of the glaciers of the Maurienne and the Isère. He was charged by the Commission on Glaciers with the study of the upper valley of the Arc. He took photographs and sketched the lower extremity of the glaciers and the positions from which they have retreated. Retrogression dominates, but in certain cases there is a stationary condition or a tendency towards advance. It was between 1892 and 1902 that the higher level in the glaciers of the upper valley of the Arc seems to have been produced; a rise which has not affected all the glaciers, and has merely weakened temporarily the great negative variation in the course of which it took place.

While writing of glaciers, we may note the initiative taken by Gen. Arvers, of the 26th Division of Infantry, in his instructions to the officers of the Alpine troops under his orders, recommending them to make careful observations of the variations in the length of glaciers—a matter, as he justly remarks, of importance to the national defence. The withdrawal of glaciers has opened to the movement of troops the more elevated passes, which become much less practicable during periods of glaciation or are even wholly obstructed by accumulations of icy masses. If these circular instructions are made general, and the facts noted by the officers of the Alpine troops are transmitted to the Commission on Glaciers, that body will soon find itself in a position to publish a very complete annual collection of observations, important for the physical study of the French Alps.

Of recent publications in geographical journals I may call attention to an article by M. Camille Vallaux in the *Annales de Géographie* for January on the oscillations in the western coasts of Brittany. The different arguments adduced to support the theory of a sinking of this portion of our sea coast (the separation of the archipelago Ushant-Molène, the drowned forests of the beaches north of the country of Léon, the engulfed legendary cities of Ys and Tolente, the ruin of the city of Tréoultré, etc.) are very well explained by the action of marine erosion, which still continues at certain points.

In a recent Bulletin of the Marseilles Geographical Society, M. Henri Barré has indicated the principal facts which direct the grouping of the population in the Provençal country.

Two important works, by M. E. Doutté, on Southern Morocco have just been published; one (in *La Géographie* for March) is a collection of notes and impressions gathered in July, 1902, in an excursion to Figuig; the other, an extract from the first volume of a work on Morocco, now in the press, relates to sacred cairns and practices connected with them. The *Annales de Géographie* published in January a letter of M. E. F. Gautier (who is now again in the Sahara) on the configuration of the regions traversed by him in 1902 as far as Timimun; he makes the remark that in the southern part of the department of Alger, with the exception of Mzab and El Golea, the country has the character of the desert (a striking contrast with the southern portion of Oran).

M. Charles Rabot, in a note published in *La Géographie* for March, makes us acquainted with the work of Lieut.-Col. Destenave's expedition to the region of Lake Chad. After completing the pacification of the country, begun by Commandant Lamy and M. Gentil, M. Destenave explored the two great groups of islands in the western Chad, as well as Kanem and the eastern shore of the lake on both sides of the Bahr el Ghazal. Detailed reconnaissances in the region of the Shari and in Wadai corroborated and completed the work of M. Gentil and his companions. The geology, the ethnography, the flora, etc., of the country were carefully studied, and the topographical work of the expedition is shown in a map of the territory extending from the Ubangi to the north of Kanem, drawn on a scale of 1 : 200,000 by Capt. Bezu. This map has been presented to the Academy of Sciences.

Another map, recently published by the *Annales de Géographie* on a scale of 1 : 500,000, is the result of six years' work—1894–1900—by M. Paul le Cointe on the lower Amazon River, between Faro and Alemquer.

The recent explorations of Messrs. Svenonius and Hamberg in Swedish Lapland are studied by M. Charles Rabot in *La Géographie*. The Swedish naturalists discovered mighty Alpine masses in a country believed, till then, to be occupied by plains, and M. Rabot emphasizes the three different aspects presented longitudinally by the territory between the Stora Lule elf (67° 30′ N. lat.) and the Lilla Lule elf (67° 00′) on one side, and between Norway and the great lakes of Sweden. In his opinion the study of the Sarjektjäkko and its glaciers, so happily concluded by M. Hamberg and his associates, is important for the physics of the globe.

Not to be overlooked is the paper of Prof. J. Brunhes, in the *Mémoires de la Société fribourgeoise des Sciences Naturelles*, on the Work of Running Waters and the Tactics of Whirlpools. Dr. John Ball's study of the Semma rapid, on the Nile, has just furnished a striking confirmation of the ideas advanced by M. Brunhes.

HENRI FROIDEVAUX.